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(54) Child's Training Pant with Elasticized Shaped Absorbent
and Method of Making the Same

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CHILD'S TRAINING PANT WITH ELASTICIZED SHAPED ABSORBENT
AND METHOD OF MAKING THE SAME

Field of the Invention

- 5 This invention relates to disposable absorbent articles, and more particularly to a child's disposable absorbent training pant having an elasticized three-dimensional absorbent for improving the containment of waste.

Background of the Invention

- 10 Various disposable absorbent articles exist today for absorbing waste material of infants and small children. One of these is a disposable diaper that is fitted on the baby by the mother or caretaker. Because an adult is doing the fitting, the diaper, in most cases, will be properly fitted on the baby. This is an advantage for the
- 15 designers of diapers since they can design an absorbent crotch that is relatively wide and flat, in relation to the baby's crotch, to improve containment, and still have the assurance that the adult will properly fit the diaper at the baby's crotch.
- 20 In contrast to babies and their diapers, children in the potty training stage and their training pants pose a different scenario. One difference is that these children put on their own training pant, which means that they are the ones responsible for ensuring the pant is properly positioned. As most parents discover, their children are

not as careful in or capable of correctly donning the training pant. This results in the training pant sometimes being worn in a twisted or turned condition at the waist and crotch, or not being pulled up to the waist sufficiently to properly fit the absorbent crotch against the wearer. Sometimes the training pant is even put on backwards.

Another problem is that a training pant having a relatively wide and flat absorbent crotch, such as that found in a typical diaper, further exacerbates the problem of an ill-fit. The situation in which a child pulls the pant upwardly in a twisted or turned fashion, or backwards, not only results in improper alignment of the absorbent with the body, but also results in a deformation of the absorbent at the crotch. The deformed absorbent generally will assume the shape of an inverted-U in the crotch. This has an extremely negative impact on the performance of the absorbent. The inverted-U shape tends to cause liquid waste to flow towards either one or both sides of the absorbent, thereby creating pools of waste at the area of least absorbent capacity and highest probability of leaking.

Another difference between the use of a diaper and training pant is that the child wearing a training pant is much more mobile and active than a baby, and this will increase the tendency or chances of a training pant to move out of the correct position.

One attempt to address the above problems was to form the absorbent crotch portion of the training pant more narrow than that of a diaper absorbent crotch portion. This was intended to make the training

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pant easier to pull up and properly position at the crotch of the wearer. It was also hoped that this would assist or maintain the pant in the proper position during various physical activities of the wearer. However, this attempt was not entirely successful, and posed
5 an additional problem of having a greater tendency of leaking due to the lesser amount of absorbent material in the crotch area, and increasing the possibility of the narrower absorbent crotch portion to be off-center relative to the point of urination.

10 Summary of the Invention

In one form of the present invention, there is provided a disposable absorbent child's training pant including a generally liquid permeable pant body having a front waist section, a back waist section, a crotch section, a waist opening, and a pair of leg
15 openings; an absorbent composite disposed in the pant body at least at the crotch section, and including a longitudinally extending absorbent central portion and a pair of longitudinally extending absorbent side portions; a weakened area between each absorbent side portion and the absorbent central portion; a liquid impermeable layer
20 disposed between the absorbent composite and the pant body, and including a pair of longitudinally extending side flaps having respective flap distal edges; and a flap elastic member elastically associated with each flap distal edge.

25 In another form of the present invention there is provided a disposable absorbent pant including a pant body having an interior space, a waist opening, a pair of leg openings, and a crotch section; an absorbent composite disposed in the interior space at the crotch

section and including an absorbent central portion and a pair of absorbent side portions; a weakened area between each absorbent side portion and the absorbent central portion; a layer disposed between the absorbent composite and the pant body and including a pair of side flaps having respective distal edges extending laterally beyond the absorbent side portions; and a flap elastic member elastically associated with each flap distal edge.

In still another form of the present invention there is provided a disposable absorbent article comprising a backsheet; an absorbent composite on the backsheet and including a pair of longitudinally extending absorbent side portions; a weakened area between the absorbent side portions; a layer disposed between the absorbent composite and the backsheet and including a pair of longitudinally extending side flaps having respective flap distal edges extending laterally beyond the absorbent side portions; and a flap elastic member elastically associated with each flap distal edge.

In still yet another form of the present invention there is provided a method of making a disposable absorbent article comprising the steps of providing a sheet of material, providing a layer on the sheet of material, positioning an absorbent composite having absorbent side portions on the layer, weakening an area in the absorbent composite, extending distal edges of the layer laterally beyond the absorbent side portions, and elastically associating an elastic member in each of the distal edges of the layer.

In a further form of the present invention there is provided a disposable absorbent pant comprising a pant body having an interior space, a waist opening, a pair of leg openings, and a crotch section; an absorbent composite disposed in the interior space at the crotch section and having a pair of absorbent side portions, each absorbent side portion having a static absorbent height; a liquid impermeable layer disposed between the absorbent composite and the pant body, the layer having a pair of side flaps in which each side flap has a dynamic flap height, the dynamic flap height being greater than the static absorbent height; and a flap elastic member elastically associated with each side flap.

In still a further form of the present invention there is provided a method of making a disposable absorbent article comprising the steps of providing a sheet of material, providing a liquid impermeable layer having side flaps with respective dynamic flap heights on the sheet of material, positioning an absorbent composite having absorbent side portions with respective static absorbent heights on the liquid impermeable layer, providing the dynamic flap heights greater than the static absorbent heights, and elastically associating an elastic member with each side flap.

Brief Description of the Drawings

The above-mentioned and other features of the present invention and the manner of attaining them will become more apparent, and the invention itself will be better understood by reference to the following description of the invention, taken in conjunction with the accompanying drawings, wherein:

Fig. 1 illustrates a fragmented front elevational view in cross section of the absorbent crotch portion of a conventional disposable article;

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Fig. 2 illustrates a front elevational view in cross section of one form of the present invention;

Fig. 3 illustrates a front elevational, partially broken-away view of
10 a training pant incorporating the principles of the present invention;

Fig. 4 is similar to Fig. 3 illustrating the effect on the crotch portion of the training pant after the wearer has urinated;

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Fig. 5 illustrates a front elevational view in cross section of another form of the present invention in the crotch of a wearer;

Fig. 6 is similar to Fig. 5 illustrating the effect of an urination;

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Fig. 7 illustrates a front elevational view in cross section of still another form of the present invention in the crotch of a wearer;

Fig. 8 is similar to Fig. 7 illustrating the effect after an
25 urination;

Fig. 9 illustrates a top elevational view of the form in Fig. 7 in a partially disassembled, stretched flat training pant; and

Fig. 10 illustrates an elevational, exploded, end view of the form illustrated in Fig. 9.

Definitions

Within the context of this specification, each term or phrase below will include the following meaning or meanings:

(a) "Member" when used in the singular can have the dual meaning of a single element or a plurality of elements.

(b) "Disposed" and variations or uses thereof are intended to mean that one element can be integral with another element, or that one element can be a separate structure joined to or connected to or placed with or placed near another element.

(c) "Elastically associated" with reference to the attachment of an elastic member to another element means that the elastic member when attached to or placed with the element gives that element elastic properties. The attaching or placing can be either directly, such as attaching or placing the member directly with the element, or can be indirectly by means of another member or element between the first member and the first element.

(d) "Disposable" includes being disposed of after use, and not intended to be washed and reused.

(e) "Elasticity", "elasticized", and "elastic" include that property of a material by virtue of which it tends to recover its original size and shape after removal of a force causing the deformation.

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(f) "Associated with" in reference to two or more elements means that the elements can be attached or placed together in any suitable manner that allows them to perform the intended or described function, while not completely inhibiting the properties of the individual elements.

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(g) "Stretch-bonded laminate", "SBL", and variations thereof mean at least a two-layered composite in which one layer is a gatherable layer and the other layer is an elastic layer. The layers are joined together when the elastic layer is in a stretched condition so that, upon relaxing the layers, the gatherable layer is gathered and the elastic layer is relaxed, non-gathered.

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(h) "Three-dimensional" refers to a finished garment similar to shorts or pants in that they have leg openings and a waist opening that are continuous, i.e., are bounded by the material of which they are made. This type of garment can be opened and laid flat only by destructively tearing it. This type of garment may or may not have manually tearable seams.

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These terms may be further defined with additional language in the remaining portion of the specification.

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Description of a Preferred Embodiment

Referring to Fig. 1, there is illustrated conventional disposable article 20 comprising backsheet 22 having absorbent structure 24 attached thereto, and a pair of containment flaps 26 having respective flap elastics 28 for gathering flaps 26. Because of the relatively large width of about 4 inches to about 6 inches of absorbent structure 24, compared to the width of about 1 1/2 inches to about 3 inches of the wearer's crotch, as article 20 is fitted on the wearer, the absorbent structure 24 tends to form a generally inverted U-shape, and containment flaps 26 begin to turn or bend downwardly and outwardly. The inverting and bending actions are due in major part to the fact that a relatively wide absorbent structure is being forcibly fitted into a relatively narrow space, i.e., the wearer's crotch. This results in pooling areas 30 formed by the downwardly-oriented sides of absorbent structure 24 and containment flaps 26. These pooling areas 30 greatly increase the probability of liquid leaking over containment flaps 26 and against the wearer; not the performance desired of any absorbent article.

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The present invention provides improved waste containment by controlling the deformation or the inverting-action of these types of relatively wide absorbent structures or composites as they are being fitted on the wearer and during movement of the wearer. By controlling the deformation or inverting of the absorbent structures or composites, the present invention permits an increased or larger absorbent surface area to be properly fitted in the narrow confines of the crotch in a comfortable manner. In addition, by controlling

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the deformation and creating a shaped absorbent structure, thinner and wider absorbent composites can be incorporated into the absorbent article or product. This combination of thinness and superior urine containment performance is particularly desired for disposable
5 absorbent training pants. The increase in absorbent surface area promotes improved coverage and absorbency in the area of the point of urination, thereby enhancing containment performance.

Referring to Figs. 3-6, and 9, there is illustrated a training pant
10 32 incorporating the principles of the present invention. It should be understood that other disposable pant-like or three-dimensional absorbent articles may also incorporate these same principles. Training pant 32 comprises a pant body 34 having a waist opening 36, leg openings 38, and an interior space 40, for fitting training pant
15 32 on the body 42 of a wearer. Pant body 34 is formed from a backsheet 44 of material that desirably is both liquid permeable and elastic. One material of which backsheet 44 can be made is a liquid permeable nonwoven web having a basis weight of about 27 grams per square meter (gsm), and which can be formed from spunbond bicomponent
20 fibers or by carding bicomponent fibers. Suitable bicomponent fibers are wettable, polyethylene/polypropylene bicomponent fibers available from CHISSO Corporation, FP Fiber Division, 5-32, Nakanoshima 3, Kita-Ku, Osaka, Japan. In this particular material, the polypropylene forms the core and the polyethylene forms the sheath of
25 the composite fiber.

Backsheet 44 can be made of other suitable liquid permeable materials. One example is a liquid permeable spunbond polypropylene nonwoven web having a basis weight of about 27 gsm.

5 Another example includes two layers of a spunbond polypropylene nonwoven web, each web having a basis weight of about 27 gsm, with multiple strands of Lycra® 940 decitex adhered under a selected

tension between the spunbond polypropylene nonwoven webs. A similar two-layer composite can be made with spunbond bicomponent fibrous webs in place of the spunbond polypropylene webs.

Still another example is a backsheet 44 made of a stretchable or elastic material that is also liquid permeable, such as a stretch-bonded laminate, or a single layer of elastic material. The

15 stretch-bonded laminate can comprise an inner layer of a prestretched elastic meltblown material sandwiched between and attached to a pair of spunbond polypropylene nonwoven webs, in which the webs have basis weights of about 14 gsm. Suitable elastic materials can be purchased from the Shell Chemical Company, Houston, Texas, under the trademark Kraton®.

The present invention contemplates that backsheet 44 can be made of a liquid impermeable material that may or may not have elastic properties. One example of a non-elastic material is a 0.6 mil polyethylene film obtainable from Edison Plastics Company, South

Plainfield, New Jersey.

Backsheet 44 can be a two-ply laminate in which the innermost layer can be the above-described liquid impermeable film or any other suitable liquid impermeable layer, and the outermost layer can be the above-described liquid permeable spunbond polypropylene nonwoven web or any other suitable liquid permeable layer. These layers can be joined together in any suitable manner.

Referring primarily to Fig. 9, backsheet 44 is illustrated in an opened, stretched-flat condition with a longitudinal centerline 46, and includes front waist section 48 having front edge 50, back waist section 52 having back edge 54, side sections 56 having respective side edges 58, and a crotch section 60. By folding backsheet 44 along a fold line that is generally perpendicular to longitudinal centerline 46, and then bonding the end portions, such as ears 98, of each side section 56 together, pant body 34 is formed having waist opening 36, leg openings 38, and interior space 40 (Fig. 3). One method of forming a pant body 34 and a training pant 32 is described in greater detail in U.S. Patent No. 4,940,464, which is assigned to the assignee of the present invention, the contents of which are incorporated by reference herein.

Still referring to Fig. 9, the use of the term "longitudinally extending" or variations thereof with reference to an element means that the element extends in a direction generally parallel to longitudinal centerline 46. The term "laterally" or "transversely" refers to a direction that is generally perpendicular to longitudinal centerline 46.

Unique features of the present invention are illustrated in various forms with reference to Figs. 2, 5-6, and 7-8. These figures typify three specific forms of the present invention, but it is understood that other forms can be designed and manufactured in accordance with the principles of the present invention. The following description is made with reference to Figs. 3-6.

Fig. 5 illustrates absorbent composite 62 and a layer 64 of material, desirably liquid impermeable, forming a generally longitudinally extending containment channel 68 in the crotch 66 of the wearer.

Containment channel 68 has a length dimension greater than the width dimension, and extends between the legs of the wearer sufficiently to form an elongated space between the crotch 66 and absorbent composite 62. As illustrated in Fig. 5, absorbent composite 62 is unloaded, i.e., dry, which means that it has not absorbed any appreciable amounts of liquid waste material. Absorbent composite 62 can

comprise any suitable absorbent material, as well as combinations of different types of absorbent material. Composite 62 desirably

comprises a mixture 70 of fluff and superabsorbent material (SAM)

wrapped in a liquid permeable tissue wrap 72. Suitable

superabsorbent materials include inorganic materials such as silica

gels or organic compounds such as cross-linked polymers. Examples

include polyacrylamides, polyvinyl alcohol, polyacrylates, various

grafted starches, and the like. A desired superabsorbent material is

a cross-linked polyiodium acrylate, which can be purchased from

Hoechst-Celanese, Portsmouth, Virginia. The superabsorbent materials

can be in various geometric forms, such as various shaped particles,

fibers, foams, and layers. The mixture 70 of fluff and SAM is

generally rectangular in shape, and in one particular shape has a length of about 38 cm and a width of about 11 cm. The fluff and SAM are present in a ratio of about 10-12 grams fluff to about 10-12 grams SAM, and have a density within the range of about 0.20 grams per cubic centimeter to about 0.35 grams per cubic centimeter. A more detailed description of this particular absorbent can be found in U.S. Patent Application Serial No. 08/096,654 filed July 22, 1993, which is assigned to the assignee of this application, the contents of which are incorporated by reference herein.

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The SAM is desirably deposited in the fluff such that more SAM is concentrated adjacent to or near backsheet 44. The mixture 70 can also be zoned, in that a greater amount of fluff and/or SAM can be located in the center of the absorbent composite 62 or toward the front or back of the composite. For example, a girl's training pant would generally have more absorbent zoned or concentrated at the longitudinal center of the absorbent composite, while a boy's training pant would have more absorbent zoned or concentrated at a position intermediate the longitudinal center and the front edge of the composite. It should also be understood that the fluff and SAM can be mixed in any desirable fashion or concentration, and that the SAM can exist as a discrete layer anywhere within the fluff, or on top of or below the fluff.

15
20

25 Absorbent composite 62 can be a single, integral absorbent structure, or can comprise a plurality of individual, separate absorbent structures and/or absorbent materials that are operably assembled together. If absorbent composite 62 comprises multiple structures,

the structures can be configured as discrete layered or non-layered shapes and configurations. Furthermore, the individual structures can be coextensive or non-coextensive. It is desired that each individual absorbent structure be arranged in operable, intimate contact along at least a portion of its boundary with at least one other adjacent absorbent structure.

Absorbent composite 62 further can be an air-laid nonwoven web comprising about 80 per cent by weight fibrous superabsorbent material and about 20 per cent by weight polymeric binder fiber. The fibrous superabsorbent materials have a denier of about 9 d and a length of about 12 millimeters. Suitable fibrous superabsorbent materials are available from Technical Absorbents Ltd. of the United Kingdom under the tradename OASIS. The polymeric binder fibers have a denier of about 3 d and a length of about 6 millimeters. Such binder fibers may be bicomponent fibers comprising about 50 per cent by weight polyethylene and about 50 per cent by weight polypropylene in a concentric sheath configuration. Suitable bicomponent binder fibers are available from Danaklon a/s of Varde, Denmark, under the tradename DANAKLON AL Thermo-C. Such a composite web may be oven used after air-laying for five minutes at a temperature of about 150 degrees Celsius. The composite web may have a basis weight of about 200 grams per square meter.

A surge layer 71 can be disposed between absorbent composite 62 and permeable layer 82, or on top of permeable layer 82, to improve the absorbency of composite 62. Surge layer 71 serves to manage, transport, accommodate, and/or direct high volumes and high flow

rates of urine into absorbent composite 62. Surge layer 71 desirably extends the total width, i.e., transverse dimension, of absorbent composite 62. Surge layer 71 can be a through-air, bonded carded web, a spunbond bicomponent nonwoven web, a web of cross-linked cellulosic fibers, or the like. Surge layer 71 can have an overall basis weight of about 50 gsm and an overall density of about 0.03 grams per cubic centimeter. Surge layer 71 can be a two-layered composite in which the first layer, which is the layer that will be adjacent the wearer's body, is a 15 gsm layer composed of 100 percent polyethylene/polyester, sheath-core bicomponent fibers having a fiber denier of about 1.8 to about 3 denier (d). The second layer, which is the outermost layer in the composite, is a 35 gsm layer composed of a mixture of bicomponent fibers and single component fibers. The bicomponent fibers form about 40 percent by weight of the outermost layer. More particularly, 35 percent by weight of the outermost layer is composed of about 1.8 d polyethylene/polyester sheath core fibers with flat crimp, and about 5 percent by weight of the outermost layer is composed of about 2 d polyethylene/polypropylene sheath core fibers with helical crimp. The single component fibers form about 60 percent by weight of the outermost layer, and are about 6 denier polyester fibers configured with a flat crimp. The polyester fibers are not hollow core fibers. Surge layer 71 is permeable to liquid when compressed under loads experienced during the wear of the absorbent article. Descriptions of other suitable materials of which surge layer 71 can be made are described in the aforementioned and incorporated U.S. Patent Application Serial No. 08/096,654. Suitable bicomponent fibers are available from CHISSO, Osaka, Japan.

horizontal manner. Thus, with reference to absorbent central portion
absorbent central portion 74 is illustrated in a relatively flat or
"upwardly" is to be understood with reference to fig. 5 in which

25 upwardly relative to absorbent central portion 74. The term
composite 62 where the absorbent side portions 76 are turned or moved
illustrated in fig. 5, there are two weakened areas 80 in absorbent
5) that extends longitudinally of absorbent composite 62. As
A unique feature of the present invention is weakened area 80 (fig.

20 can be made of different absorbent materials.
addition, absorbent central portion 74 and absorbent side portions 76
a lower density than any one of the absorbent side portions 76. In
Desirably, absorbent central portion 74 has a higher basis weight and
15 concentration of SAM as one of the absorbent side portions 76.

absorbent central portion 74 can have a higher, lower, or the same
density as one of the absorbent side portions 76. Similarly,
absorbent central portion 74 can have a higher, lower, or the same
or the same basis weight as one of the absorbent side portions 76, or
10 For example, absorbent central portion 74 can have a higher, lower,
have the same or different absorbent and/or physical characteristics.
76. Absorbent central portion 74 and absorbent side portions 76 can
case of absorbent central portion 74 are the absorbent side portions
intermediate of two spaced-apart positions or elements, which in the
5 crotch portion 78 (fig. 9). The term "central" means to be

longitudinally extending absorbent side portions 76, and an absorbent
longitudinally extending absorbent central portion 74, a pair of
Referring to figs. 5 and 9, absorbent composite 62 includes a

74 in Fig. 5, absorbent side portions 76 are turned upwardly or vertically at an angle to absorbent central portion 74. This provides absorbent composite 62 with a shape that is important in enhancing its performance as an absorbent. Weakened area 80 can be continuous or discontinuous in order to allow absorbent side portions 76 to move upwardly relative to absorbent central portion 74, as illustrated in Fig. 5. A weakened area 80 can be provided by various methods. One method is to form absorbent composite 62 with tapering absorbent side portions 76 as illustrated in Fig. 5. For example, absorbent central portion 74 can have a generally uniform thickness, while an absorbent side portion 76 can taper in a converging manner in a direction away from absorbent central portion 74. Generally, the tapering will begin at least about 1 centimeter in from the longitudinal edge of an absorbent side portion 76, and preferably about 2 centimeters in from the longitudinal edge of an absorbent side portion 76. Absorbent composite 62 also can be of generally oval shape in transverse cross-section, in which absorbent central portion 74 has its greatest thickness along its longitudinal centerline.

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Another method for providing weakened areas 80 is to form an absorbent composite 62 having its greatest thickness along the centerline 46 and along or near both of its longitudinal edges, with a lesser thickness between each longitudinal edge and centerline 46. In transverse cross-section, this would have an undulating appearance.

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absorbent composite 62 in any suitable manner well known in the art. Having a basis weight of about 25 gsm. Layer 82 can be wrapped about its desired that permeable layer 82 be a spunbonded polypropylene web permeable by a multiplicity of apertures therethrough. However, it Also, layer 82 can be a film of liquid impermeable material rendered permeable layer 82. Layer 82 can be rendered permeable in numerous ways. For example, permeable layer 82 can be made of the same material and in the same manner as a liquid permeable backsheet 44.

Continuing to refer to fig. 5, absorbent composite 62 is enveloped by permeable layer 82. Layer 82 can be rendered permeable in numerous

or shaped without the necessity of a weakened area 80. designed or comprised of materials that permit it to be easily flexed However, it should be understood that absorbent composite 62 can be permits an absorbent side portion 76 to be movable upwardly. "weakened area" to include any design, mechanism, or method that As described, the present invention thus contemplates the term

absorbent central portion 74. that does not totally separate an absorbent side portion 76 from or score is meant that absorbent composite 62 is cut in a fashion can move upwardly relative to absorbent central portion 74. By slit weakened area 80 at which that particular absorbent side portion 76 (figs. 7 and 10) can be run along absorbent composite 62 to provide a separately cutting absorbent composite 62, a slit or score line there is no absorbent central portion 74. Rather than totally, 76 in operable, intimate contact with each other (fig. 2); in fig. 2, absorbent composite 62, and then positioning absorbent side portions Weakened area 80 can also be provided by longitudinally cutting

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A pair of absorbent elastic members 84 are elastically associated with absorbent side portions 76. In Fig. 5, each absorbent elastic member 84 is just slightly spaced-apart from the longitudinal edge of its respective absorbent side portion 76 and is enveloped by permeable layer 82. Each absorbent elastic member 84 is desirably three strands of Lycra® 940 decitex that are attached at their ends at an elongation of about 250 percent. Each individual strand in a respective absorbent elastic member 84 is spaced from another adjacent elastic strand by about 3 mm distance. These elastic strands can be obtained from E. I. DuPont De Nemours Company, Wilmington, Delaware. Each absorbent elastic member 84 can be one or more strands of the above described elastic, or can be made of other suitable elastic materials such as natural rubber, synthetic rubber, or thermoplastic elastomeric polymers. These elastic materials may also be heat-shrinkable or heat-elasticizable, and can also be a single ribbon of elastic material. Layer 82 also can be totally or partially elastic or stretchable. The direction of stretch can be in the longitudinal direction, transverse direction, or in multiple directions. Generally, the direction of stretch is determined during the manufacturing of the elastomeric material, and is related to the molecular orientation of the manufactured material. Suitable elastic materials are described in the aforementioned and incorporated U.S. Patent No. 4,940,464.

Fig. 5 illustrates each absorbent elastic member 84 as being spaced-apart from its respective absorbent side portion 76, but the present invention contemplates that each absorbent elastic member 84

can be in other positions relative to its respective absorbent side portion 76. For example, an absorbent elastic member 84 can be positioned underneath or on top of its respective absorbent side portion 76. In any specific placement and attachment, absorbent elastic members 84, upon being relaxed, will tend to urge an absorbent side portion 76 upwardly relative to absorbent central portion 74, as described above. Alternatively, if desired, absorbent elastic members 84 need not be incorporated into or with absorbent composite 62.

Still referring to Fig. 5, layer 64 can be liquid permeable or liquid impermeable, but desirably is liquid impermeable. More desirably, layer 64 is a multi-layer laminate in which the innermost layer 106 is liquid permeable. The innermost liquid impermeable layer 106 can be a 0.6 mil polyethylene film from Edison Plastics Company, and the outermost liquid permeable layer 108 can be a spunbond bicomponent polyethylene/polypropylene nonwoven web made of fibers from CHISSO Corporation. The outermost layer 108 may be C-folded over impermeable layer 106, as illustrated in Fig. 10.

Layer 64 includes a pair of side flaps 86 that have respective flap distal edges 88 that can extend laterally or transversely beyond corresponding absorbent side portions 76. Each flap distal edge 88 has a flap elastic member 90 elastically associated therewith. Flap elastic members 90 can be made of the same or different materials as absorbent elastic members 84. Layer 64 is laterally continuous in that it extends below or underneath absorbent composite 62 (Fig. 5)

and laterally or transversely there beyond, so as to form side flaps 86 and flap distal edges 88. There also is an extendable area 92 that forms part of each side flap 86. This permits side flaps 86 to extend, as illustrated in Figs. 5 and 6. Extendable areas 92 can be prefabricated in each side flap 86 in any suitable manner, such as by pleating, wrinkling, folding, or the like. Alternatively, layer 64 can be provided without any such prefabrication, and in this case will have a width, i.e., transverse measurement, of sufficient dimension that will result in the forming of extendable areas 92 during the initial fitting of the training pant at the crotch. In other words, when the distal edges 88 contact the crotch and the training pant is pulled further upwardly into the crotch, side flaps 86 will become compressed and shorten in length, thereby forming extendable areas, such as extendable areas 92. Furthermore, if desired, layer 64 or portions thereof can be made of any suitable elastic material, similar to those materials of which backsheet 44 can be made, that dispenses with the need to pleat, fold, or the like, since the elastic material will be inherently extendable.

Layer 64 is attached or joined to absorbent composite 62 by means of attachment area 94, which can be a single line, multiple lines, or single or multiple swirls of adhesive. Attachment area 94 can also be provided by numerous types of bonding, such as ultrasonic, heat, or the like. It is not necessary that the entire mutually facing surfaces between absorbent central portion 74 and layer 64 be totally adhered together. However, if the mutually facing surfaces are entirely adhered or attached, then extendable areas 92 should be carefully provided with the desired extension that at least equals or

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exceeds the sag or drop of a loaded absorbent composite 62. As illustrated in Fig. 5, a single narrow bead of adhesive at the crotch can suffice.

5 Referring now to Fig. 6, absorbent composite 62 is illustrated in a

"loaded" condition, i.e., it has absorbed liquid waste, and under the weight of that absorbed liquid has sagged or moved downwardly from

crotch 66. Important to the present invention is the fact that even though absorbent composite 62 has separated in distance from crotch

56 of the wearer, flap distal edges 88 have maintained contact with crotch 66 because of the extension of extendable areas 92 and the

elastic influence of flap elastic members 90. One way of describing the mechanism of this seal or contact of distal edges 88 against

crotch 66 is to refer to side flaps 86 as having dynamic flap

15 heights, and absorbent side portions 76 as having static absorbent heights, in which the dynamic flap heights are greater than the

static absorbent heights. The words "dynamic" and "static" in this description are better understood with reference to Fig. 6 which

20 illustrates extendable areas 92 in a fully extended state with flap distal edges 88 still in contact with crotch 66, but with absorbent

composite 62 separated in distance from crotch 66. The "dynamic" heights of side flaps 86 mean that the side flaps 86 extend and

maintain contact with crotch 66 when absorbent composite 62 is loaded, and the "static" heights of absorbent side portions 76 mean

25 that portions 76 do not maintain contact with crotch 66 when absorbent composite 62 will dictate whether and how much composite 62

separates from crotch 66. Dynamic flap heights and static absorbent

heights generally will be in a range between about 25 to about 75 millimeters, with a dynamic flap height greater than a static absorbent height.

- 5 Fig. 3 illustrates absorbent composite 62 in an unloaded state, and flap distal edges 88, as well as absorbent side portions 76, being in contact with the body of the wearer. Fig. 4 illustrates absorbent composite 62 in a loaded state in which absorbent composite 62 has separated away from contact with the body of the wearer, but in which
10 flap distal edges 88 continue to make sealing contact with the body, thereby improving containment of waste material.

- Fig. 2 illustrates a differently designed or configured absorbent composite 62 in which there is a single weakened area 80 that permits
15 composite 62 to assume a V-like shape. In this form of the invention, there is no absorbent central portion 74 between the absorbent side portions 76.

- Figs. 7 and 8 illustrate another absorbent composite 62 that has a
20 fluff/SAM mixture 70 that is relatively uniform in thickness. A pair of weakened areas 80 permit absorbent side portions 76 to move upwardly relative to absorbent central portion 74. Both flap distal edges 88 and absorbent side portions 76 are in contact with crotch 66. Fig. 8 illustrates absorbent composite 62 of Fig. 7 in a loaded
25 state in which absorbent side portions 76 have separated from crotch 66, but in which flap distal edges 88 still maintain contact with crotch 66.

Figs. 9-10 illustrate the construction of one form of the present invention. Specifically, with reference to Fig. 9, backsheet 44 is generally I-shaped with four elastic areas 96 elastically associated with respective ears 98. Ears 98 are formed by leg cut-outs 97 in backsheet 44. Elastic areas 96 can be formed of multiple strands of elastic material arranged in any fashion, such as parallel, intersecting, or both. Furthermore, elastic areas 96 can be a film or laminate of elastomeric material. Various materials and examples of providing elasticity at ears 98 are described in U.S. Patent No. 4,940,464 and U.S. Patent Application Serial No. 08/043,132 filed March 25, 1993, both of which are incorporated by reference herein. These two incorporated references also disclose materials and methods of incorporating leg elastic members 100 in respective leg openings 38 (Fig. 3), and waist elastics 102 in respective front and back waist sections 48, 52. Also, backsheet 44 can be made of a single layer of elastic material, or a layer of elastic material with other non-elastic layers, as described earlier with reference to a SBL.

Continuing to refer to Figs. 9 and 10, waist elastics 102 are adhesively attached to backsheet 44 by waist elastic adhesive 104. This adhesive and those following can be any suitable adhesive and applied in any suitable pattern. Suitable adhesives can be obtained from Findley Adhesives, Inc., Wauwatosa, Wisconsin. The adhesives can be applied in any manner such as spraying, slot-coating extrusion, printing, or the like. The adhesive can be sprayed in any desired configuration or design such as continuous or discontinuous bead(s), discontinuous or continuous swirl(s), melt-blown pattern, spray pattern, or the like. Layer 64 is adhesively adhered to

backsheet 44 by attachment adhesive 112. Attachment adhesive 112 should be applied with the same care and attention as attachment area 94 with regard to extendable areas 92. Fig. 10 further illustrates layer 64 as including liquid impermeable film 106 and a liquid permeable layer 108. The ends of permeable layer 108 are C-folded around film 106 and flap elastic members 90. Film 106 and permeable layer 108 are adhered together by laminating adhesive 110. Attachment area 94 adhesively attaches permeable layer 82 to layer 64, such as with parallel beads of adhesive, and is applied in an I-shaped pattern in which the laterally disposed portion of adhesive attaches the ends of layer 82 to layer 64. Permeable layer 82 is wrapped about absorbent composite 62 and adhesively secured thereto by adhesive spray 114. Flap adhesive 116 attaches the ends of side flaps 86 on top of absorbent side portions 76; the intermediate portions of side flaps 86 being unattached. Surge layer 71 is adhered to absorbent composite 62 by surge adhesive 118. Elastic areas 96 and leg elastic members 100 are adhered to backsheet 44 by area adhesive 120. Elastic areas 96 can also be provided in or to backsheet 44 as described earlier. The present invention also contemplates that the attachment of elements or structures can be accomplished other than by adhesives, such as by ultrasonic bonding, heat bonding, and the like.

In manufacturing one form of the present invention, backsheet 44 is supplied with leg cut-outs 97 in a continuously moving fashion and has leg elastic members 100 and waist elastics 102 applied in any suitable manner; one such manner is described in the aforementioned U.S. Patent No. 4,940,464. Elastic areas 96 are applied or provided

at respective ears 98; one such manner is described in the
aforementioned U. S. Patent Application Serial No. 08/043,132.

Absorbent composite 62 is positioned on the continuously moving
backsheet 44. Absorbent composite 62 can be applied in a continuous
5 manner or as separate, discrete absorbent structures. Absorbent
composite 62 has weakened areas 80 provided therein, and this can
occur either prior to or after absorbent composite 62 has been
positioned on backsheet 44. Layer 64 is also provided in a
continuous manner between absorbent composite 62 and backsheet 44.
10 Backsheet 44 is separated, i.e., cut, transversely to form individual
absorbent articles. Thereafter, ears 98 are joined together along
their corresponding side edges 58 to form training pant 32. The
adhering or bonding of these elements can be performed as describe
above.

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While this invention has been described as having a preferred
embodiment, it will be understood that it is capable of further
modifications. This application is therefore intended to cover any
variations, equivalents, uses, or adaptations of the invention
20 following the general principles thereof, and including such
departures from the present disclosure as come or may come within
known or customary practice in the art to which this invention
pertains and falls within the limits of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A disposable absorbent child's training pant, comprising:
 - a generally liquid permeable pant body comprising a front waist section, a back waist section, a crotch section, a waist opening, and a pair of leg openings,
 - an absorbent composite disposed in said pant body at least at said crotch section thereof, said absorbent composite comprising a longitudinally extending absorbent central portion and a pair of longitudinally extending absorbent side portions,
 - a weakened area between each said absorbent side portion and said absorbent central portion for allowing each said absorbent side portion to be movable upwardly relative to said absorbent central portion,
 - a liquid impermeable layer disposed between said absorbent composite and said pant body, said liquid impermeable layer comprising a pair of longitudinally extending side flaps having respective flap distal edges, and
 - a flap elastic member elastically associated with each said flap distal edge for gathering a respective said side flap.
2. The pant of claim 1 wherein each said absorbent side portion has a static absorbent height, and
 - wherein each said side flap has a dynamic flap height,
 - said dynamic flap height being greater than said static absorbent height.

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3. The pant of claim 2 further comprising an elastic member elastically associated with each said absorbent side portion.
4. The pant of claim 3 wherein said liquid impermeable layer is attached to said absorbent central portion.
5. The pant of claim 4 wherein said absorbent central portion has a higher basis weight than one of said absorbent side portion.
6. The pant of claim 5 wherein said absorbent central portion has a lower density than one of said absorbent side portions.
7. The pant of claim 1 further comprising a surge layer disposed with said absorbent composite.
8. The pant of claim 1 wherein said liquid impermeable layer is elastic.
9. The pant of claim 1 wherein said pant body is elastic.
10. A disposable absorbent pant, comprising:
a pant body comprising an interior space, a waist opening, a pair of leg openings, and a crotch section,
an absorbent composite disposed in said interior space at said crotch section, said absorbent composite comprising an absorbent central portion, and a pair of absorbent side portions,
a weakened area between each said absorbent side portion and said absorbent central portion,

a layer disposed between said absorbent composite and said pant body, said layer comprising a pair of side flaps having respective distal edges extending laterally beyond said absorbent side portions, and

a flap elastic member elastically associated with each said flap distal edge for gathering a respective said side flap.

11. The pant of claim 10 wherein said layer is liquid permeable.
12. The pant of claim 10 wherein said layer is liquid impermeable.
13. The pant of claim 10 wherein each said absorbent side portion has a static absorbent height, and
wherein each said side flap has a dynamic flap height,
said dynamic flap height being greater than said static absorbent height.
14. The pant of claim 10 further comprising an elastic member elastically associated with each said absorbent side portion.
15. The pant of claim 10 wherein said pant body is liquid permeable.
16. The pant of claim 10 wherein said pant body is liquid impermeable.
17. The pant of claim 10 further comprising a surge layer disposed on said absorbent composite.

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18. The pant of claim 10 wherein said layer is elastic.

19. A disposable absorbent article, comprising:

a backsheet,

an absorbent composite disposed on said backsheet and comprising
a pair of longitudinally extending absorbent side portions,
a weakened area longitudinally extending between said absorbent side
portions,

a layer disposed between said absorbent composite and said
backsheet, said layer comprising a pair of longitudinally extending
side flaps having respective flap distal edges that extend laterally
beyond said absorbent side portions, and

a flap elastic member elastically associated with each said flap
distal edge for gathering a respective said side flap.

20. The article of claim 19 further comprising an elastic member
elastically associated with each said absorbent side portion.

21. The article of claim 19 wherein each said absorbent side portion
has a static absorbent height, and

wherein each said side flap has a dynamic flap height,

said dynamic flap height being greater than said static
absorbent height.

22. The article of claim 19 wherein said layer is attached to said
absorbent composite.

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23. The article of claim 19 wherein said backsheet comprises a front waist section, a back waist section, a crotch section between said front section and said back section, and a pair of side sections, and forms a waist opening and a pair of leg openings.

24. The article of claim 19 wherein said backsheet is liquid permeable.

25. The article of claim 19 wherein said backsheet is liquid impermeable.

26. The article of claim 19 wherein said backsheet is elastic.

27. The article of claim 19 wherein said layer is liquid permeable.

28. The article of claim 19 wherein said layer is liquid impermeable.

29. The article of claim 19 wherein said layer is elastic.

30. The article of claim 19 further comprising a surge layer disposed on said absorbent composite.

31. A method of making a disposable absorbent article, comprising the steps of:

providing a sheet of material,

providing a layer on the sheet of material,

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positioning an absorbent composite having absorbent side portions on the layer,

weakening an area in the absorbent composite,

extending distal edges of the layer laterally beyond the absorbent side portions, and

elastically associating an elastic member in each of the distal edges of the layer for gathering the distal edges.

32. The method of claim 31 further comprising the step of elastically associating an elastic member with each absorbent side portion.

33. The method of claim 32 further comprising the step of joining portions of the sheet together to form a waist opening and a pair of leg openings.

34. A disposable absorbent pant, comprising:

a pant body comprising an interior space, a waist opening, a pair of leg openings, and a crotch section,

an absorbent composite disposed in said interior space at said crotch section, said absorbent composite having a pair of absorbent side portions, each said absorbent side portion having a static absorbent height,

a liquid impermeable layer disposed between said absorbent composite and said pant body, said liquid impermeable layer having a pair of side flaps, each said side flap having a dynamic flap height,

said dynamic flap height being greater than said static absorbent height, and

a flap elastic member elastically associated with each said side flap for gathering said side flap.

35. The pant of claim 34 further comprising a weakened area disposed in said absorbent composite.

36. The pant of claim 34 further comprising a liquid permeable layer disposed with said absorbent composite.

37. The pant of claim 36 wherein said liquid permeable layer is elastic.

38. The pant of claim 36 wherein said pant body is elastic.

39. The pant of claim 34 further comprising a surge layer disposed on said absorbent composite.

40. The pant of claim 34 wherein said liquid impermeable layer is elastic.

41. The pant of claim 34 further comprising an elastic member elastically associated with each said absorbent side portion.

42. A method of making a disposable absorbent article, comprising the steps of:

providing a sheet of material,

providing a liquid impermeable layer having side flaps with respective dynamic flap heights on the sheet of material,

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positioning an absorbent composite having absorbent side portions with respective static absorbent heights on the liquid impermeable layer,

providing the dynamic flap heights greater than the static absorbent heights, and

elastically associating an elastic member with each side flap.

43. The method of claim 42 further comprising the step of weakening an area in the absorbent composite.

44. The method of claim 42 further comprising the step of providing an elastic, liquid permeable layer on the absorbent composite.

45. The method of claim 42 further comprising the step of providing a surge layer on the absorbent composite.

ABSTRACT

A child's training pant includes a pant body having a waist opening and a pair of leg openings, and an elasticized shaped absorbent composite having elasticized absorbent side portions. Elasticized side flaps are formed from a liquid impermeable material situated
5 between the absorbent composite and the pant body. A method is also provided for making a training pant.

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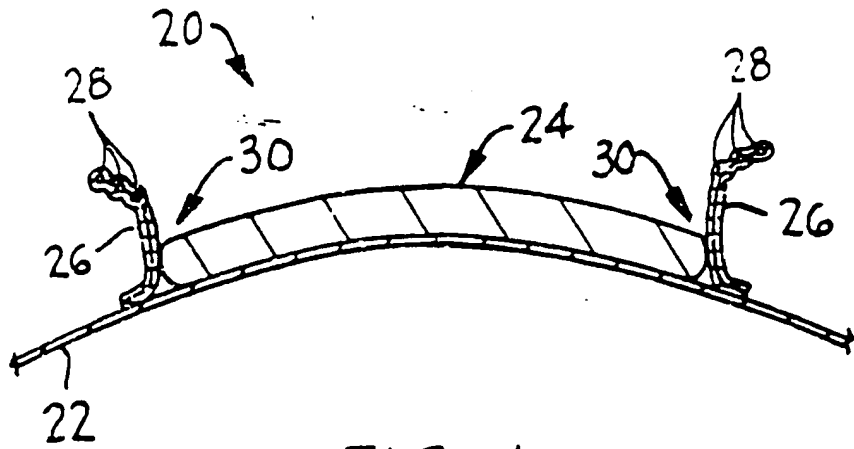


FIG. 1
(PRIOR ART)

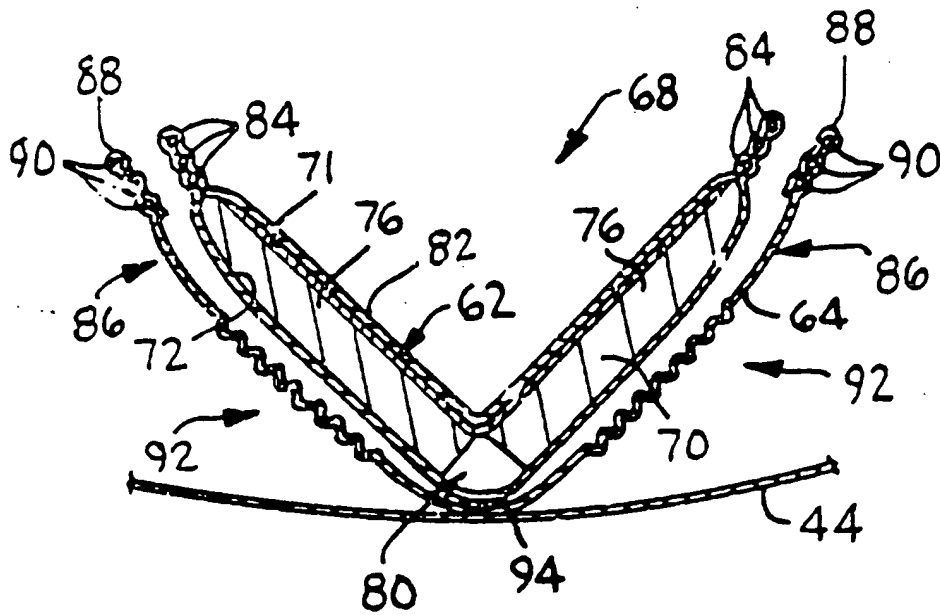


FIG. 2

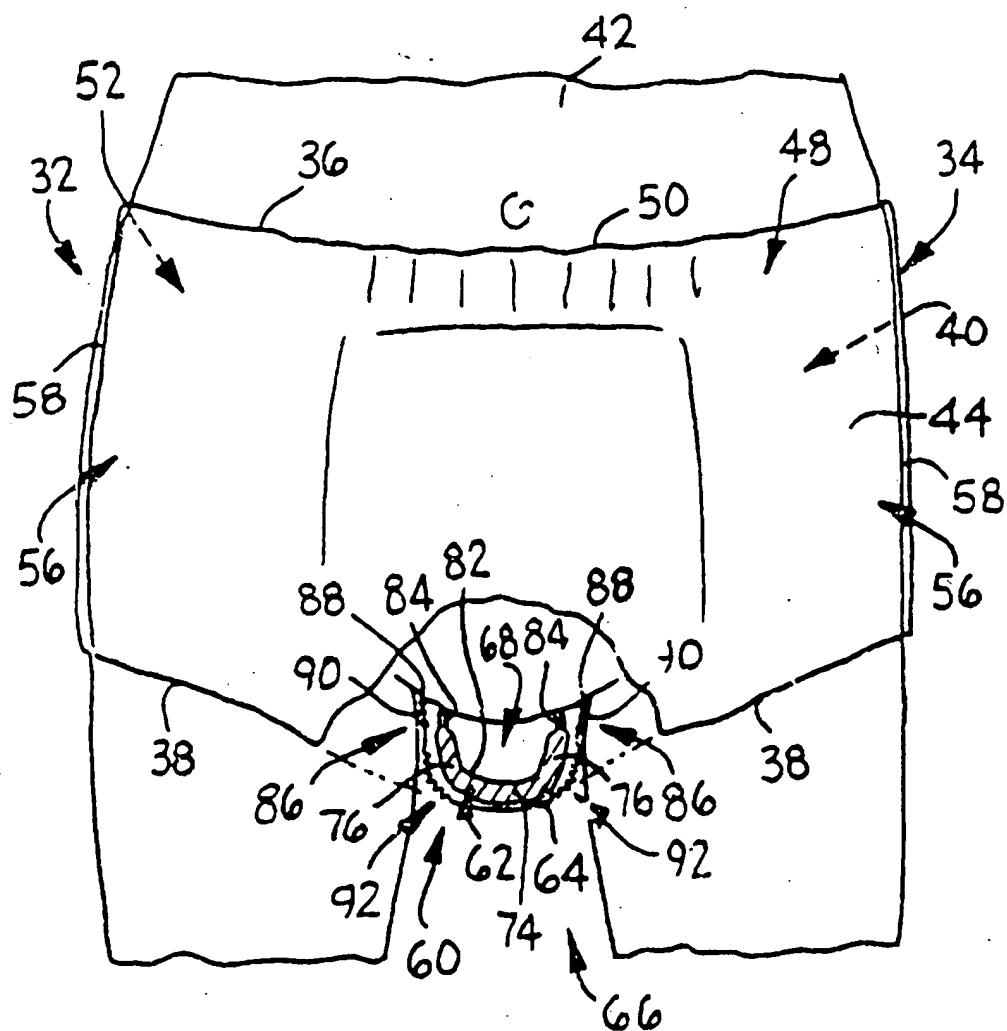


FIG. 3

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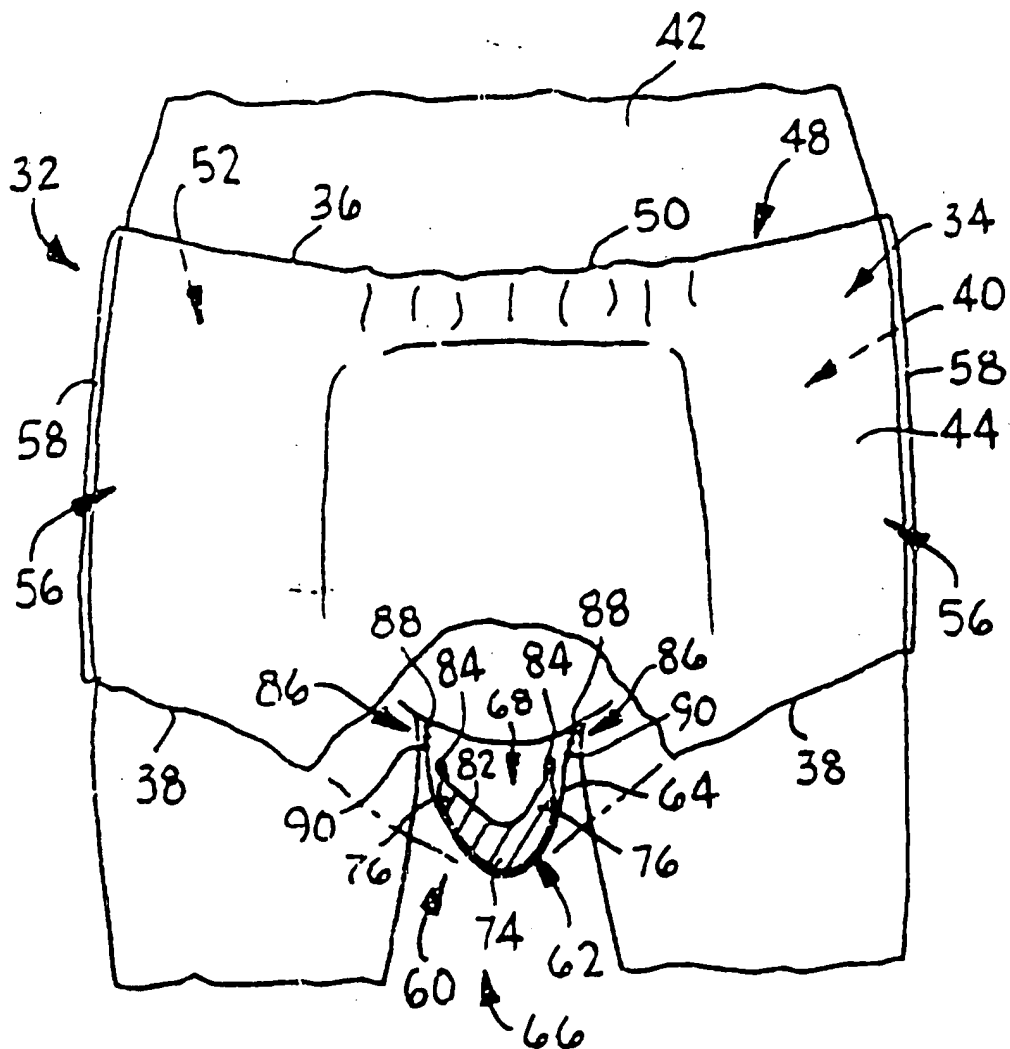
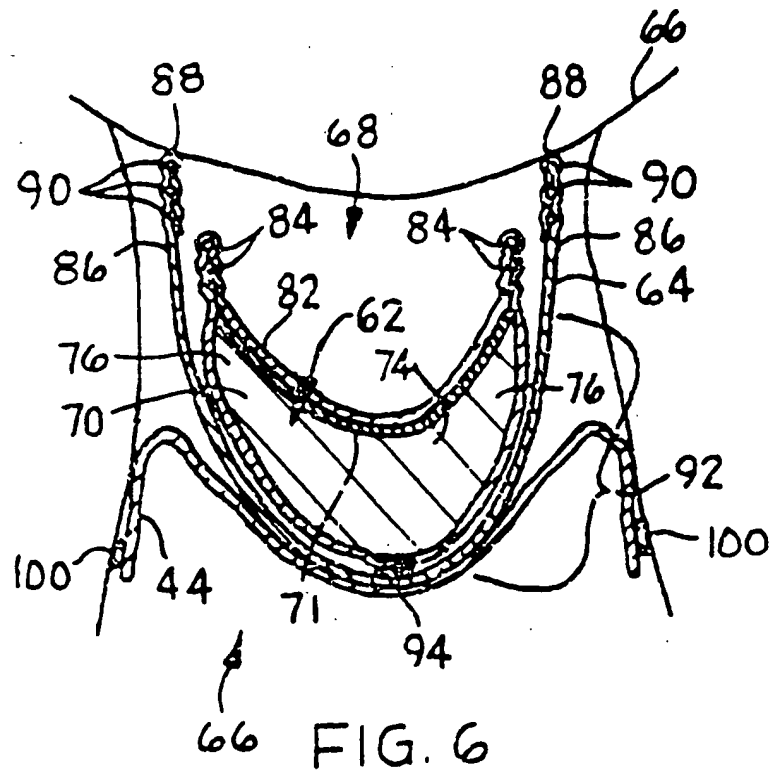
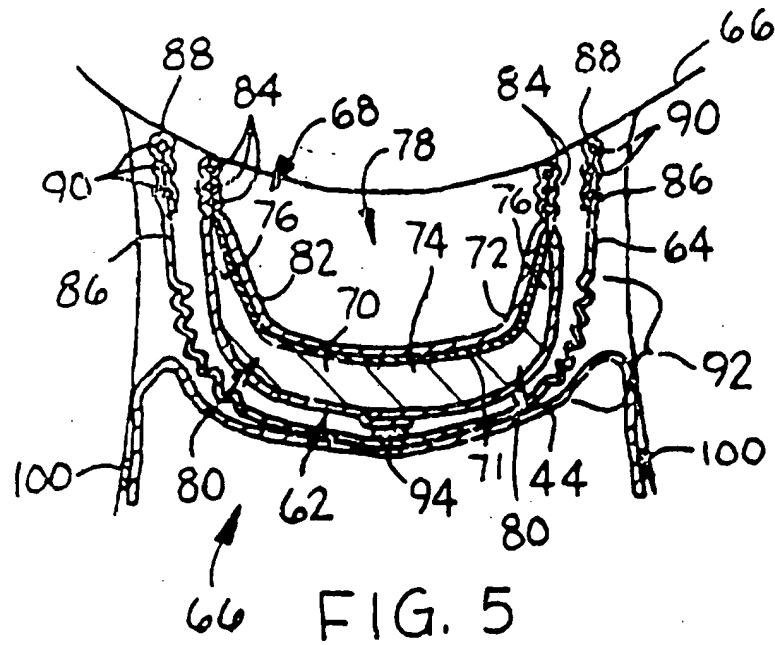


FIG. 4



66 FIG. 8

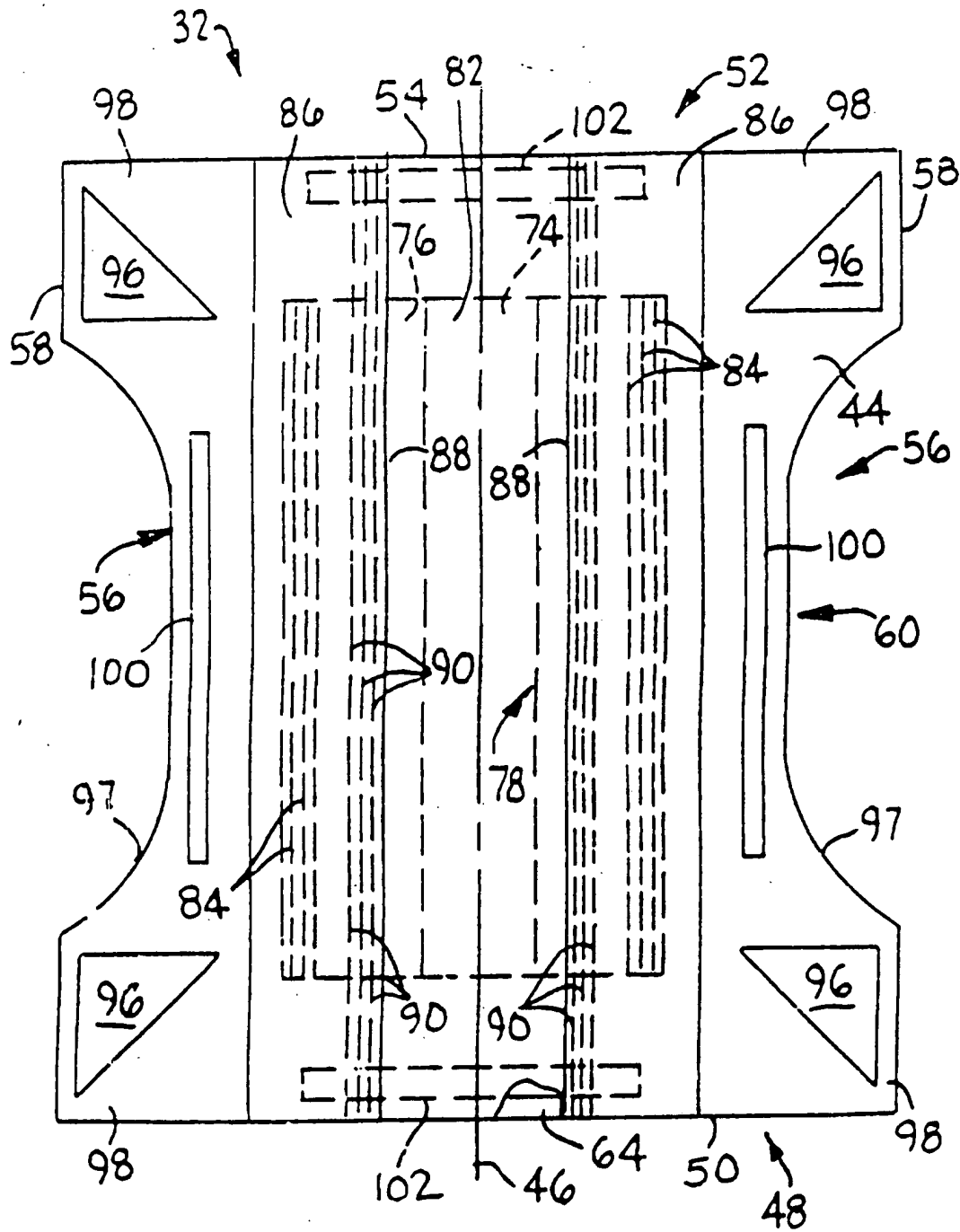


FIG. 9

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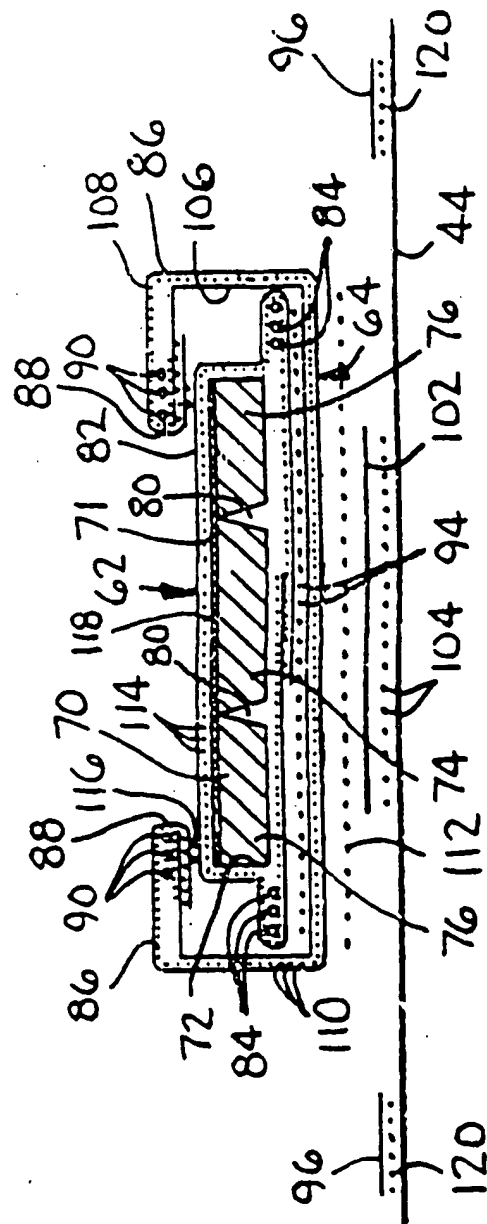


FIG. 10